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# **The anti-GMO advocacy: an institutionalist and systems-theoretic assessment**

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## *Abstract*

### *Purpose:*

Public debates on the use of genetically modified organisms (GMOs) are strongly influenced by the NGO-led advocacy, most of which is harshly critical of genetic engineering. This advocacy has resulted in discourse failures marked by the disregard for the scientific consensus on the risks and benefits of GMOs. The paper presents a theoretical inquiry into this phenomenon.

### *Design/methodology/approach:*

Drawing on American institutionalism and Niklas Luhmann social systems theory, the paper explains these discourse failures in terms of the problematic relationship between institutions and technology.

### *Findings:*

Clarence Ayres would likely see these discourse failures as a form of "institutional resistance" to the progress of science and technology. In contrast, Marc Tool's social value principle stresses the importance of democratic legitimation and public acceptance of new technologies, while being sensitive to the possibility of ideologically biased discourses. It is argued that the institutionalist understanding of the interplay between democracy, science, and technology would benefit from a better account of Niklas Luhmann's concept of "complexity reduction".

### *Social implications:*

The article shows that some NGOs are powerful enough to actively shape, if not manipulate, public attitudes and sentiments against GMOs.

### *Originality/value:*

The case of the anti-GMO advocacy calls for a new conceptualization of how democracy, science, and technology fit together.

**Keywords:** American Institutionalism, NGO Accountability, Discourse Failure, GMO

## 1. Introduction

Over the years, the use of genetically modified organisms (GMOs) in agriculture has become one of the most hotly debated and controversial issues in public discussions on food safety, health, agricultural production, and the environment. A remarkable feature of these discussions has been an active involvement of NGOs which went a long way to associate GMOs with multiple hazards and dangers. NGO campaigns have been so successful in influencing public beliefs that, as of today, a significant share or even a majority of consumers in the Western world view GMOs as an unsafe technology (cf. MacDonald & Whellams, 2007). The problem with this view is that it goes against what appears to be the declared consensus in science. Paarlberg (2014, p. 224) traces the “dubious success” of NGO campaigns in public discourse back to the BSE crisis and the according “completely legitimate food safety scare that had nothing to do with GMOs”. Greenpeace, Friends of the Earth and the European Consumer Organization (BEUC) have been riding the wave of public mistrust in warning citizens of the risks of GM food “simply on ‘precautionary’ grounds” (ibid). Numerous supra-national institutions such as the United Nations or the European Union rightly give NGOs participatory influence over their political decision-making processes with a view on empowering civil society (cf. Will and Pies, 2016) and giving voice to environmental and societal challenges that would otherwise remain unheeded in public debates. It is hard to resist the impression, however, that some NGO campaigns contribute to discourse failures, in particular when they rest on populist positions (Will & Pies, 2016). Discourses can be said to fail when their participants disregard relevant scientific scholarship and evidence while being driven by emotions (Haidt, 2012; Siegrist, 2000; Connor and Siegrist, 2010) and moralistic claims (Fink and Yolles, 2018; Will and Pies, 2016; Hielscher et al., 2016; Wallis and Valentinov, 2016).

This article suggests that the discourse distortions apparently arising from some NGO campaigns can be diagnosed and explained along the lines of American institutionalism (cf. Rutherford, 2007). In a sense, major lines of institutionalist thinking can be seen as an attempt to reveal and address certain forms of discourse failures that institutionalist scholars had identified in mainstream economic thought, in particular in neoclassical economic. According to institutionalist positions, discourse failures in mainstream economics occurred in debates on a broad range of concepts, including the ideas of capitalism, markets (ibid), corporations, competition (Galbraith, 1967), and human nature (Tool, 2001). Regarding these and other concepts, John Kenneth Galbraith (1967), a renowned institutional writer, distinguished between “conventional wisdom” and “circumstances.” His concern was to contrast the allegedly obsolete conventional wisdom of the idea of perfect competition with the evolving technological and organizational circumstances of the “new industrial state,” such as the pervasive corporate power, which, according to his view, was masked and promoted by the dominant neoclassical orthodoxy (ibid). An even more interesting parallel between GMO-related debates and American institutionalism springs to mind upon recollecting the idea of institutional resistance to technology, an idea most adamantly advocated by Clarence Ayres. It is indeed hard to deny that GMOs present an outcome of scientific-technological scholarship that is resisted because of its misfit with some of the institutionally prescribed beliefs on not only the acceptable food but even the acceptable role of man in the order of nature.

Apparently, this moralistic and emotional rhetoric embroiled the resistance that drew Ayres' criticism over half a century ago.

Identifying these parallels is not intended to gloss over the essential differences between those discourse failures that were analyzed by institutionalists and those that seem to be induced by some modern NGOs. For one, NGOs themselves are rather a new kind of actor that has not attracted much interest of institutionalist scholars (cf. Valentinov, 2011). While much critical ink was spilled on corporations, their role in the GMO context seems to be that of losers rather than winners, let alone powerful vested interests. Also, science and technology that gave rise to GMOs stand in a negative rather than positive light, somewhat along the lines of the institutionalist concept of "ceremonial encapsulation" (Bush, 1987; Elsner 2012). In the case of GMOs, the NGO-induced discourse failures do not meaningfully translate into critiques of schools of economic thought. Instead, the remarkable feature of these failures is the proliferation of emotional and moralistic reasoning. All these differences provide fertile ground for a further development of the ethical core of institutionalism, authoritatively summarized by Marc Tool's social value principle which refers to "the continuity of human life and the non-invidious recreation of community through the instrumental use of knowledge" (Tool, 2001, p. 293). Thus, to apply it to the disturbingly-disregarded cases of NGO-induced discourse failures, Tool's principle needs a certain adjustment.

We argue that the required adjustment may draw inspiration from at least two systems-theoretic ideas of Niklas Luhmann, a luminary of contemporary sociological thought. One of these ideas is the critique of moral communication. Replacing the classical sociological view of the normative integration of society by the systems-theoretic vision of structural coupling of social systems, Luhmann did not envisage an essential role for morality. What is more, he took person-centered moral communication to be inherently unfit for the discussion of the ubiquitous systemic problems in society (Horster, 2012; Neckel and Wolf, 1994). He explicitly warned of the potential conflict generated by moral communication and called on ethics theory to develop approaches able to address them. While Luhmann's theoretical skepticism about moral communication is not without its critics (Reese-Schäfer, 1999), it still provides a promising avenue to capture and analyze discourse failures. We reckon Tool's principle can benefit a great deal from this perspective.

Another of Luhmann's interesting ideas is that of complexity reduction, which he saw as the function of social systems (cf. Luhmann, 1995; cf. Roth, 2017; Roth et al., 2017). This 'service' is rendered necessary by the fact that the limited cognitive capacity of human individuals would not allow them to make sense of the exceedingly complex societal environment. What Luhmann did not fully appreciate, however, is that moral communication itself may be a form of complexity reduction, a kind of "rational ignorance" or "rational irrationality" (Caplan, 2007), used by discourse participants who happen to be overburdened by the compound nature of debated issues (Hielscher et al., 2016).

Understood in this broad sense, the idea of complexity reduction potentially informs not only Tool's principle but also the institutionalist literature more generally. We believe it helps institutionalism to better come to grips with the phenomenon of NGO-induced discourse failures. We elaborate in detail on this proposition in the remainder of this paper.

## **2. NGOs and GMOs: uneasy bedfellows**

## *2.1. The main arguments against GMOs*

The advocacy of a number of prominent NGOs against GMOs boils down to essentially three arguments: GMOs are presented as harmful for human health and the environment; GMOs are assumed to serve the economic interests of corporations at the expense of consumer welfare; and mainstream GMO research is supposed to be sparse, unreliable, and inconclusive with regard to GMOs' long-run effects. So far, these three arguments have been at the core of NGOs' successful campaigns for banning GMOs and GM foods in Europe.

Argument 1: "GMOs are harmful to humans and the environment." According to Friends of the Earth (2016), the majority of GMOs in agriculture have been engineered to develop two features: to contain Bt insecticide in all plant cells and to be resistant to certain herbicides. The NGO contends that genetic engineering led to an increase in the "use of harmful pesticides, decreasing genetic diversity and significantly increasing corporate control over seeds, farmers and agricultural research" (ibid). In the same document, GM crops are said to account for the dramatically rising use of Glyphosate, the occurrence of "superweeds," and the decimation of milkweed and monarch butterflies. Earth Open Source, cited by the Organic Consumers Association (2016a), reports that GM crops "can be toxic, allergenic or less nutritious than their natural counterparts." Still worse, this report claims that "animal studies link the consumption of GMOs to an increase in allergies, kidney and liver disease, ADHD, cancer, infertility, chronic immune disorders and more" (Organic Consumer Association, 2016b). Along similar lines, Greenpeace (2016a) criticizes that "[g]enetic engineering enables scientists to create plants, animals, and micro-organisms by manipulating genes in a way that does not occur naturally."

Argument 2: "GMOs serve economic interests only." Adopting the posture of citizens' steward, Greenpeace is harshly critical of those companies that deny the public the "right to know about GE [genetic engineering] ingredients in the food chain" (2016a). Of particular concern to Greenpeace (ibid) is the spreading of GM plants through cross-pollination which is supposed to be harmful to humans and the natural environment. Friends of the Earth (2016) likewise fear that "[c]orporations are driven to design, patent and profit from new biotechnologies rather than protect the public good." While admitting that the new biotechnologies may indeed contribute to addressing environmental and public health challenges, the NGO claims that these innovative products are benefiting corporations at "the expense of people and planet" (ibid), primarily because of the power imbalance between corporations and consumers. Corporations "have far more power to determine how these technologies get used than people around the world who are affected by them" (Friends of the Earth, 2016).

Argument 3: "GMO research is unreliable and inconclusive." Greenpeace (2016a), underlining its skeptic position, urges that "GMOs should not be released into the environment since there is not an adequate scientific understanding of their impact on the environment and human health," a position closely echoed by Friends of the Earth (2016). According to Michael Hansen (2014, p. 5), senior staff scientist of the American Consumers Union, "there is virtually no independent safety testing of these crops in the US due to intellectual property rights problems." Friends of the Earth (2016) cite Hilbeck et al. (2015, p. 1) who refer to some "scientific research articles ... that report disturbing results from ... [GMO] feeding experiments with different animals." The "number" which Friends of the Earth (2016) have in mind is exactly two, one of which is the highly disputed paper by Séralini et al. (2014).

The arguments put forward by NGOs have had far-reaching political repercussions at various levels. Taking to heart NGOs' concerns, in 2003 the European Union subjected the approval of GM plants to strict regulations intended to "[p]rotect human and animal health and the environment." Since 2010, these regulations are enforced by the European Food Safety Authority which undertakes the science-based evaluation of GM plants before their introduction into the European single market (European Commission, 2016; Davison, 2010), with the European Parliament and the European Commission additionally deciding on GM crop approvals on a case-by-case basis. The whole process of safety assessment turned out to be so complicated and long-winded that only one GM crop, the MON810 corn, could make it through so far (Eur-lex, 2001). Furthermore, the individual EU member states can temporarily restrict or prohibit the use and sale of GM crops on their territories if they provide reasons for doing so. As of now, 19 member states, including Germany and France, have made use of this opportunity (Coghlan, 2015), banning thereby even the MON810 corn, the single GM crop approved in the EU.

This situation had been barely possible if NGOs did not enjoy active participation rights in the political decision making in the EU's nested political bodies. Contrary to the United States, where the political role of NGOs has not been sufficiently institutionalized to prevent GM food production from flourishing (Doh and Guay, 2006, p. 65), NGOs have succeeded to bring virtually all of this production to a halt in Europe (Bernauer and Meins, 2003, p. 677). Currently, Greenpeace (2016b) is launching a new campaign to blight any possible attempts to relax European regulations by invoking the arguments of democracy and citizen rights. The claim is that people in Europe "have massively rejected GMOs, and ... governments have started to ban their cultivation, but agro-chemical companies have cooked up a new way to get GMOs onto the European market" (ibid). The successful campaigns of NGOs against GM foods have not been limited to Europe though. As Paarlberg (2014, p. 224) notes, these campaigns "have succeeded in the developing world because they first succeeded in Europe." As a result, only a handful of countries in Africa still allow growing GMO crops and retain access to one of the most efficient agricultural technologies.

## *2.2. The state of science*

Contrary to beliefs promoted by NGOs, the overwhelming majority of high-quality scientific studies shows no additional risk of GMOs or GM foods to human health and the natural environment compared to the dangers of traditional food technologies. This is the central message of the open letter signed by 121 Nobel Prize-winning scientists who take issue with Greenpeace's ongoing advocacy against GMOs (Laureates Letter Supporting Precision Agriculture, 2016). The Nobel laureates heavily accuse Greenpeace of misrepresenting the "risks, benefits, and impacts [of GMOs]" and of supporting the "criminal destruction of approved field trials and research projects" (ibid). As "[t]here has never been a single confirmed case of a negative health outcome for humans or animals from [the] consumption [of GMO technologies]," these scientists call upon Greenpeace to present these technologies fairly and in full awareness of the fact GM foods could help to feed a growing global population and to put an end to severe nutritional deficiencies, such as the lack of vitamin A, in developing countries.

Many important national and supra-national academies of science and medicine are pleading for more balanced political discussions of GMOs. According to the report of the United States National Academy of Science, Engineering, Medicine (2016, p. 10), “no differences have been found that implicate a higher risk to human health safety from these GE foods than from their non-GE counterparts.” A similar conclusion was reached by the French Academy of Sciences (Académie des Sciences, 2014) that exposes the current criticism of GM crops as scientifically unfounded. In 2010, the European Union’s Research Directorate concluded a lengthy report with the statement that “the efforts of more than 130 research projects, covering a period of more than 25 years of research, and involving more than 500 independent research groups” have shown that “biotechnology, and in particular GMOs, are not per se riskier than e.g. conventional plant breeding technologies” (European Commission, 2010, p. 16). A few years later, the European Academies Science Advisory Council (2013, p. 1-2 and 8) maintained that GMOs should “be allowed to take its place among the scientific advances that European plant breeders and farmers can call upon” to address the challenges of population growth, rising food demand, and climate change. Given the overwhelming evidence, the National Academy of Sciences in Germany (Leopoldina) and the Union of the German Academies of Sciences and Humanities (2015) advocated the abolishment of the law that bans the field tests and commercial cultivation of GMOs in Germany.

### *2.3. The discourse failure diagnosis*

In sum, the public debate on GMOs in Europe, including the NGO campaigning against GMOs, appears to be a discourse failure (Hielscher et al., 2016) for several reasons. First, as our case illustration shows, NGOs have predominantly emphasized the potential risks of GMOs while making dubious statements about the lack of scientific consensus on this issue.<sup>1</sup> Second, NGO campaigning has belittled the potential benefits of GM technologies, such as the benefits to the natural environment as well as to the developing countries faced with the challenge of under- and malnutrition. Third, NGOs have brought this biased representation to bear on European politics, eventually turning political discussions against the actual scientific consensus (Lynas, 2015). The ban on GMOs is an outcome of this discourse failure.

It seems to be wrong, however, to attribute this failure to the supposedly malicious intentions of NGOs’ leaders. The dynamics of complex institutional systems is more appropriately explained in light of the “logic of the situation” (Popper, 1945, p. 90) or the “rules of the game” (North, 1990) than by imputations of personal maliciousness, which are typical of “conspiracy theories” (Popper, 1945, p. 94). Put simply, the NGO campaigning against GMOs likely presents an unintended, rather than intended, consequence of behavior (Hielscher et al., 2016; Will and Pies, 2016; cf. Lah et al. 2016). It is a well-known case that NGOs compete for donor funding and consequently for media space (Hielscher et al., 2017). As Swinnen (2011) has shown empirically, the competition for media space can lead to highly biased representations of facts and arguments. As an example, before 2006, NGOs had alarmed the media that small farmers in the developing world were being hurt by low food prices on global markets, suggesting that these prices need to be increased (ibid). Then, a dramatic rise in food prices beginning in 2007 caused NGO campaigns to turn into the opposite position, presenting the high food prices as a plague for low-income urban populations which could not afford expensive food, especially in the developing countries (ibid). In these examples, NGOs failed

to mention the beneficial effects of low food prices for urban dwellers and of high food prices for local farmers in developing countries, apparently because the positive news would not create a media alarm (ibid). This kind of behavior is, however, entirely rational in light of NGOs competing for the attention of potential members, supporters, and potential donors.

This media bias may also explain why NGOs are successfully focusing on making up intuitive stories that dock to as many emotional or “moral taste buds” of the audience as possible (Haidt, 2012; for the role of moral emotions see also Lindebaum et al. 2017). Unsurprisingly, such stories will likely contain simplifications, biases, and populist positions that are immune to the scientific state of the art. The NGO-GMO nexus is a telling example of this kind of strategy. In their seminal work on empirical moral psychology, Haidt and Graham (2007) and Haidt (2012) identify six “moral taste buds” in humans: care, fairness, liberty, loyalty, authority, and sanctity. The GMO campaigns successfully activate four of them. The “care” category is enlisted since as NGOs warn against potentially harmful effects of GMOs; “liberty” and “fairness” are invoked in the critique of corporate power that allegedly poses a threat to consumers, citizens, and small-scale farmers who oppose GM crops. Last but not least is the appeal to the “sanctity” of nature. Genetic engineering is presented as an impious gamble with the genetic heritage of plants, with the implicit endorsement of the metaphysical view of the beneficence of nature for the human race. Along similar lines, Blancke et al. (2015) trace the public opposition to GMOs back to unjustified essentialism, teleological and intentional thinking, and the emotion of disgust.

This case study illustrates that the quality of public discourses on GMOs strongly depends on the nature of incentives motivating the discourse participants, such as NGOs, journalists, politicians, corporations, and scholars. It is clear that the proliferation of moral claims and emotions prevents the discourses from accommodating a balanced account of both benefits and risks of biotechnological innovations as reflected in the scientific state of the art (Hielscher et al., 2016). Whereas the involvement of NGOs in political decision-making is rightly justified by the model of deliberative democracy, this justification cannot be reasonably assumed to cover the case of the NGO-induced discourse failure. Instead of translating discourse failures into political failures, deliberative democracy is called upon to set up a better institutional framework that would make it less attractive for discourse participants to rely on biased campaigning strategies. While deliberative scholars are beginning to discuss promising avenues (Mansbridge et al., 2012), the normative benchmark of this endeavor should not be participation but the consensus of society given to the consequences of collective decisions (Hielscher et al., 2014).

### **3. The institutionalist perspective**

#### *3.1. The relevance of the institutionalism of Clarence Ayres*

The emotionalization and moralization of public discourses dealing with the acceptance of novel technologies invite the reconsideration of the work of Clarence Ayres. As an influential but also controversial scholar of American institutionalism, Ayres argued that institutions never fail to resist the emergence of technological innovations. Drawing on the work of John



Dewey (1922), he saw “the history of the human race [a]s that of a perpetual opposition of... the dynamic force of technology continually making for change, and the static force of ceremony—status, mores, and legendary belief—opposing change” (Ayres, 1978, p. 176). While this is a compelling vision, it involves an unfortunate oversimplification and downplaying of the crucial role of institutions. As Hodgson (2004, p. 353) points out, “Ayres did not understand that institutions can enable activity as well as constrain it and that institutions provide indispensable stuff and structure to social life.” No less contestable was the Ayresian conceptualization of the science-technological continuum as “a direct and unambiguous means of evaluation” (ibid, p. 349). Independent of the reductionist view of institutions as ceremonies, Ayres came up with an appealing and intuitive idea for the present-day public debates about GMOs. This is the idea of institutional resistance to technological progress (cf. Ayres, 1978, p. xxvii).

The reason why this idea is particularly germane to the GMO discourse is that it potentially accounts for the phenomena of emotionalization and moralization. Drawing on the entirely uncontroversial argument that in human behavior “social conditioning intervenes between physical stimulus and physical response” (Ayres, 1961, p. 54), he has shown the social conditioning to be the primary determinant of the feelings and emotions experienced by human beings. Because the social conditioning itself reflects the prevailing institutions, he argued, the emotional rejection of the advancing technology presents just another form of institutional resistance. In his words, “the ceremonies are re-enactments of what is presumed to be tribal history – the more ancient the better; hence their emotional impact” (Ayres, 1978, p. xvii). Furthermore, he joined Dewey (1929) in emphasizing the inherent relation between the prevailing moral beliefs and the “institutional imperative,” i.e., the conception that “all good things result from the assiduous practice of institutional mores” (Ayres, 1978, p. 186). He came to realize that the prevailing definitions of right and wrong must be expressions of ceremonial-institutional behavior (ibid, p. 163). These expressions are reinforced by emotions (ibid, p. 172), such as disgust and horror arising from the violation of taboos (ibid, p. 164). Accordingly, if emotionalization reflects the institutional resistance to the emerging technologies, so do moral appeals.

Nor is this all. Ayres (1961, p. 63) also pointed to the subtle association of hedonistic morality with the unacknowledged metaphysical basis of neoclassical economics: “the spontaneity and vigor of ... likes and dislikes seemingly provided the clearest kind of evidence that likes and dislikes are “natural” phenomena – that they are “given” attributes of all mankind, implanted in human nature by the Creator as one of the “pre-established harmonies” of the Order of Nature.” These critiques, of course, hark back to the famous Veblenian diagnosis of pre-Darwinian preconceptions of the contemporaneous (but also a significant share of the modern) economic science. In the seminal (1898) article “Why is economics not an evolutionary science?”, Veblen characterized the standpoint of classical economists as that of “ceremonial adequacy:” the “ultimate laws and principles which they formulated were laws of the normal and the natural, according to a preconception regarding the ends to which, in the nature of things, all things tend. In effect, this preconception imputes to things a tendency to work out what the instructed common sense of the time accepts as the adequate or worthy end of human effort” (Veblen, 1990, p. 65). Ayres and many other institutionalists would have most likely endorsed Veblen’s (1990, p. 95) diagnosis that the “imputation of final causes to the course of phenomena expresses a spiritual attitude which

has prevailed... in the eighteenth-century metaphysics”, with examples being the doctrines of natural rights and the order of nature.

Evidently, these philosophical critiques of the economic science likewise apply to the preconceptions underlying the negative public attitudes to GMOs. According to Blancke et al. (2015), these preconceptions center around the teleological view of nature as the beneficial order. This view is reinforced by the essentialist thinking and the emotion of disgust which is activated when the allegedly fixed natural essences, such as DNA, are seen to be altered. It is a paradox, but it seems that the Veblenian-Ayresian critique of the teleological preconceptions of (neo)classical economics anticipates Blancke et al.’s (2015) philosophic deconstruction of the public opposition to GMOs. And, on reflection, it does not appear to be an accidental coincidence.

### *3.2.Revisiting Marc Tool’s social value theory*

Since Ayres, the institutionalist school has progressed significantly, with the landmark achievement being Marc Tool’s contributions to the theory of instrumental value. These contributions are brought to a head in Tool’s social value principle. As Dugger (1995, p. 195) explains, “technological progress was the central concept in Ayres’s instrumentalism. Tool’s more recent instrumentalism includes technological progress, but in dealing with the revolutionary upsurges of the 1960s, Tool makes democratic participation the central element of social value theory. Therein lies the Tool legacy”. Democratic participation, or “the democratic quest” in Tool’s terminology, is inextricably linked to the “human capacity to think critically and coherently over wide areas of their experience” (Tool, 1986, p. 7; Tool, 2001; Dugger, 1995). This capacity is thought of as counteracting the so-called “ism-ideologies” which work toward removing theoretical material “from the universe of inquiry and truth-seeking from which it allegedly emerged” (Tool, 2001, p. 27).

Even though both Tool and Ayres drew inspiration from Dewey (1922; 1929), Tool’s ideas on critical thinking and democracy result, among other things, in an explanation of institutional resistance that is different from that of Ayres, for whom this resistance takes the form of “past-binding myths,” i.e., “tradition, superstition, and magic” (Dugger, 1995, p. 201). In Ayres’ eyes, “all these are anachronisms, holdovers from the tribal, primitive past” (ibid). In contrast to Ayres, Dugger (ibid, p. 202) argues that Tool’s approach “points toward a critique of the power of elites to impose invidious distinctions and cause disruptions of community re-creation through the use of ism-ideologies that block meaningful participation in the ongoing inquiry into how to further the good life.” According to Tool’s understanding, democracy means that “those who are affected by valuations should participate in the valuations” (ibid, p. 204) which challenges “elitism as the most serious resistance to progress in instrumental valuing” (ibid).

The ambivalent role of NGOs in the present-day GMO debates challenges Tool’s legacy in essential ways. Granted NGOs are legitimately associated with democracy and democratic participation. But acknowledging their democratic quality does not exempt these participating organizations from legitimate charges of elitism and ideological bias. In fact, it seems plausible to argue that the democratic impact of NGOs is only put fully into effect if they prove such charges to lack justification. The GMOs debate thus illustrates that Tool’s social value principle itself requires acknowledgment that the democratic participation of institutions

per se does not guarantee the successful organization of public discourse. This acknowledgment, in turn, calls for a more nuanced conception of institutions.

After Ayres, the conception of institutions has, in fact, become much more elaborate. In Hodgson's (2004, p. 377) assessment, "at least in its treatment of technology and institutions, the work of J.F. Foster, Tool, Bush and others was more sophisticated than that of Ayres himself. Not only was Ayres's inadequate definition of an institution replaced, but also there is a more complex and illustrative taxonomy of possible relations between the instrumental and the ceremonial. To a great extent, the work in this post-Ayresian tradition has been a long retreat from Ayres's strict and questionable dichotomy". This retreat is manifest in J.F. Foster's (1981) point of view, according to which "it would be unethical to do nothing or to do too little for the purpose of facilitating the necessary institutional adjustment. But it would be equally unethical to attempt to force unfeasible change which might cause intolerable dislocations and maladjustments in the system" (Hill and Troub, 1995, p. 82). Drawing on J.F. Foster's work, Tool (2001) proposed three "limiting conditions" of institutional adjustment, one of which is "the availability of warrantable knowledge," whereas "the ability of a people to understand and accept the change being introduced" is another (ibid, p. 173). The "third limiting condition ... has to do with the degree and timing of contemplated structural change. Any proposed abandonment of invidious or ceremonial activities of persons in institutions (to increase the effectiveness of the institution in performing its instrumental functions) must do the least possible violence to other instrumental functions of that or other institutions. Adjustment must be 'minimally dislocative'" (ibid, p. 174).

The last two limiting conditions identified by Tool add a further nuance to the role of NGOs by suggesting that the introduction of genetic engineering may indeed be more than "minimally dislocative." Even if genetic engineering is entirely justifiable given the "available warrantable knowledge," it may still put the institutional texture of society to substantial strain. The last two limiting conditions may be read as an urge that this possibility is taken seriously, or at least more seriously than Ayres would have likely thought of it. In this spirit, Klein (1995, p. 150) emphasized that "instrumental valuation... must be democratically incorporated into the social process. 'Lags' are a part of the process, therefore, of democratic incorporation of the fruits of technological progress into ongoing society." It seems that the role of NGOs is just that: their activity comes down to the 'democratic incorporation' of genetic engineering, being at the same time indicative of the lagged nature of this process. Although this is a highly legitimate role, NGOs apparently cannot be advised to act in discourse-distorting ways. In fact, the NGO-GMO nexus calls for a new synthesis of the Ayresian scientific-technological continuum and the Toolian democratic participation. Both of these foci of instrumental value are attainable only if organically merged. Technology and science that disregards the democratic quality of society is failed science, abridged by a misleading concept of the social (cf. Hielscher et al., 2014). A democracy that ignores the scientific-technological continuum is failed democracy, crippled by the distorting effects of discourse failures.

#### **4. Insights from Niklas Luhmann's social systems theory**

If the case for merging science, technology, and democracy is correct, then institutionalism needs a respective attunement in the conceptualization of the instrumental function of

institutions. As Klein (1995, p. 133) put it, at stake is a theoretical account of the mechanism whereby institutions provide a “housing” of sorts to technology. To be sure, the nature of this “housing” is a fundamental question going to the heart of American institutionalism and institutional economics more generally. While no final answer can be attempted here, it seems pertinent to draw readers’ attention to the possibility that one can deal with this question in terms of Niklas Luhmann’s systems-theoretic idea of complexity reduction (cf. Hayden 2016). As mentioned earlier, Luhmann saw complexity reduction as the primary function of social systems. Their function is, in turn, to relieve individuals from the almost impossible task of grasping the infinitely proliferating complexity of the societal environment.

On reflection, this infinitely proliferating complexity is a concept that is not at all alien to institutionalism. In fact, this idea is implied in Tool’s first limiting condition of institutional adjustment, i.e., the availability of warrantable knowledge. It stands to reason that this knowledge in its entire interconnectedness cannot be processed by any human individual. Veblen (1990, 325 et seq.) seems to have drawn on a similar intuition in stating that the “information and proficiency in the ways and means of life vests in the group at large; and, apart from accretions borrowed from other groups, it is the product of the given group, though not produced by any single generation... The mass of technological knowledge possessed by any community, and necessary to its maintenance and to the maintenance of each of its members or subgroups, is too large a burden for any one individual or any single line of descent to carry”. Accordingly, “an individual can know only a tiny fraction of the total stock of knowledge” which means that “knowledge is specialized” (McCormick, 2006, p. 35). A logical implication of specialization is that “the opportunity cost of capabilities in one kind of activity is incapacities in many other kinds” (Loasby, 1999, p. 66). Adam Smith’s (1795) *History of Astronomy* is another seminal contribution emphasizing the link between specialization and the exponential expansion of scientific knowledge. The essential point here is this: If the complexity of the warrantable knowledge stretches the limits of cognitive capacities of human individuals, then meaningful human action logically requires complexity reduction. And it seems plausible to see complexity reduction as a basic instrumental function of some institutions (cf. Thompson and Valentinov, 2017).

Linking complexity reduction with institutions seems to be a direct, if not mechanical, transfer of the central Luhmannian concept into institutionalism. But there is a crucial difference. In the institutionalist context, complexity reduction is not as axiomatic as it appears to be in Luhmannian systems theory. To Luhmann, complexity reduction always works and is, in effect, coterminous with social systems as such. Commentators on Luhmann noted that complexity reduction might have problematic consequences related to the deteriorating sustainability of social systems (cf. Valentinov, 2017). But this critique does not call into question the functioning of complexity reduction *per se*. In contrast, Tool’s second and third limiting conditions of institutional adjustment do suggest that complexity reduction *per se* may break down. In line with Tool’s ideas, this breakdown occurs when the steadily expanding base of warrantable knowledge turns out to be so complex that it fails to be understood by the affected stakeholders, or causes severe dislocations that affect these stakeholders adversely.

Regarding its impact on public discourse, the envisioned breakdown of complexity reduction will logically engender a bifurcation of two types of argumentative strategies. First, there will be voices pressing for the adoption of newly expanded warrantable knowledge in

ways that may prove disruptive to the institutions providing structure and meaning to the life of some other stakeholders. Second, unsurprisingly, these stakeholders will likely protest using argumentative counter-strategies that boil down to what Ayres referred to as institutional resistance. As Ayres noted, if institutional resistance takes the shape of public discourse, then this discourse will be marked by both emotionalization and the proliferation of moral claims. Apparently, both of these argumentative strategies have been employed in the GMO debate. Following the terminology developed by Hielscher et al. (2016), these strategies can be coined “cynic” and “moralistic” reasoning, respectively. Whereas Hielscher et al. (ibid) explain these two strategies as individually-rational moves within an allegedly zero sum game between technology-driving corporations and the broader society, they may likewise be seen as manifestations of the institutional failure to reduce the complexity of highly complex technology adequately. What is more, given that scientific and technological knowledge continually evolves, such failures need to be acknowledged as a regular phenomenological pattern of modern societies.

There seems to be an interesting parallel between Ayres’s critical view of the moral dimension of institutional resistance and Luhmann’s skeptical assessment of the role of moral communication in modern society. Luhmann (1991, p. 84) considered moral communication to be “a special form of communication which carries with it indications of approval or disapproval... Approval or disapproval is attributed typically according to particular conditions. Morality is the usable totality of such conditions”. The problem with this communication, according to Luhmann, is that the objects of approval and disapproval are persons who do not bear *individual* responsibility for circumstances that are institutional and structural in nature. As an example, it is indeed difficult to disagree with Luhmann’s argument that “we do not want the government to be declared structurally good and the opposition structurally bad or worse evil. That would be the death sentence for democracy. The same result can be seen in the case of true/untrue, of good or bad marks, of financial payments or their omission, of love decisions for one partner but not for another. According to Luhmann, functional codes need to operate on a level of a higher *amorality* because they must make their two values available for all operations of the system” (Luhmann, 1991, p. 86; cf. Luhmann, 1993). In making a case for the “higher amorality” of the modern functionally differentiated society, however, Luhmann appears to be throwing the baby out with the bathwater, for any institutional regime is predicated on the existence of a particular type of morality (Rutherford, 2007).

From the institutionalist perspective, however, Luhmann’s skepticism contains a sound core related to the Ayresian concept of institutional resistance. The Luhmannian standpoint highlights that the continually advancing scientific, technological, and civilizational complexity is bursting the bounds of the absorption capacity of prevailing institutions. The institutionalist perspective, however, does not need to be limited to the Luhmannian standpoint alone. By emphasizing instrumental value, institutionalists are no less interested in the meaning of the complexity reduction function of institutions if this function is assumed to be well-functioning. It seems convenient to specify this meaning along the three dimensions of the resistance to change that have been identified in the organization theory literature: emotional, cognitive, and intentional (Piderit, 2000, p. 786).

A key point about the emotional dimension is that the institutionalist perspective, despite the Ayres-Luhmann parallel identified above, must not be taken to be generally dismissive of

emotions and moral communication. There is no reason why these phenomena cannot present a stand-in for the unknown if the extant scientific knowledge is assumed to be limited and provisional. It is no secret that, throughout most human history, and especially in pre-modern times, religious morality has been developed to play an indispensable role in preventing catastrophes such as violence and disease. As Schaik (2016, pp. 124-165) argues, many of early Judaism's laws, for example—including strict rules of cleanliness and sexual intercourse; laws limiting contact with strangers and excluding the unclean from the community; as well as rules against bestiality and homosexuality—were intended to prevent the spread of infectious diseases caused by bacteria, viruses, or fungi (cf. also Clark, 2010 and Murdock, 1980). As Schaik (2016, p. 152) has it, priests used simple empirical methods of experience to establish a causal relationship between a problem and a solution: “Medical symptoms ... were identified as a threat, but the real cause of the illness remained a mystery. ... Nevertheless, these laws had the desired effect (decreased infections) because they were based on the identification of dangerous behavior (sexual intercourse). In this instance, God served as a kind of heuristic. He was the variable that bridged the gap in knowledge and led to the adoption of hygienic measures.”

In a sense, religious morality can thus be thought of as “protomedicine” that encourages human beings to exercise caution (or precaution) when societies lack reliable scientific knowledge about the potentially harmful consequences of new challenges and innovative technologies. In today's modern world, a non-religious morality of precaution still plays a role in policy discussions, albeit a contested one. For example, the “precautionary principle” states that new technologies should be disallowed until it can be proven that they will not cause harm to individuals, groups, norms or other traditions. As critics point out, however, the precautionary thinking might ignore the opportunity costs of anticipatory, centrally-planned strategies of risk prevention. In its extreme form, “trying to preemptively plan for every hypothetical worst-case scenario means that many best-case scenarios will never come about” (Thierer, 2016, p. 82). For example, Hazlett (2017) argues that the world could have enjoyed the benefits of the cell phone much earlier if regulatory processes to receive permission had not delayed its launch for many decades. In the modern world, thus, the challenge is to use the precautionary traits of morality, and the emotions connected with it, to support—and not to stifle—the trial-and-error process of scientific research. This support constitutes the emotional dimension of the institutional complexity reduction function instrumentally conceived.

The cognitive dimension of the resistance to change identified by Piderit (2000, p. 786), if seen through the lens of the instrumental value theory, would underscore the significance of the high quality of conceptual and theoretical systems that structure the knowledge about the change in question. A lively stream of scholarship in cognitive science (Suedfeld et al., 1992; Wallis, 2015) has made clear that the conceptual and theoretical systems may differ widely in their ability to accommodate (and be revisable in the light of) complex evidence. Wallis (2015) proposed to measure this ability in terms of the features of complexity and systemicity. Discourse failure, and the dysfunctional resistance to technological change, are likely if the prevalent conceptual and theoretical systems are marked by fragmentation and atomism rather than by the requisite complexity and systemicity. The latter qualities are attainable through the use of techniques such as the integrative propositional analysis (Wallis, 2015; cf. Wallis and Valentinov, 2016). The proliferation of discourse failures and the dysfunctional moralistic communication render such techniques increasingly relevant, for they present practical

instruments of developing not only better arguments but also better ways of sharing the publicly available knowledge.

The intentional dimension of the resistance to change noted by Piderit (2000, p. 786) accentuates the role of the situational incentives faced by acting individuals. In the present context, this dimension translates into the need for the appropriate institutional framework of the discourse process. The accountability of NGOs seems to be an essential part of this framework. Will and Pies (2017) argue that discourse failures may present a systematic unintended result of NGOs' campaigns driven by fundraising considerations. According to Will and Pies (*ibid*), this unfortunate result can only be avoided if NGOs adopt institutionalized commitments enforced by authoritative third parties with an eye to ensuring high standards of transparency and accountability. In a similar vein, Hielscher et al. (2017) develop a rational-choice-based governance approach identifying the dilemma situations faced by NGOs as well as the possible win-win solutions that are attainable through the mechanisms of NGO self-regulation (cf. Iliopoulos (2013) for a related argument on the eligibility of agricultural cooperatives for receiving public policy support).

## **5. Concluding remarks**

One of J.K. Galbraith's remarkable contributions to institutionalist thinking is the idea of "revised sequence," which drives home the point that corporations are able to subtly shape and manipulate the needs of consumers, turning them, to use his trenchant expression, into the "indentured servants of the industrial system." If corporations are indeed able to do so, this is by virtue of their economic and societal power that tends to be downplayed by conventional wisdom. The present article, and the case study presented therein, suggests that in the context of anti-GMO advocacy, the "revised sequence" may be likewise applicable to the relation between NGOs and the public. Similar to corporations in Galbraith's work, some NGOs are powerful enough to actively shape, if not manipulate, public attitudes and sentiments against GMOs. The power of NGOs engenders discourse failure which means that the scientific assessment of GMO risks and benefits takes back seat to emotions and moral claims. Although some of its aspects have been anticipated in the work of Clarence Ayres and Marc Tool, this form of discourse failure remains a quite novel phenomenon to institutionalism. Whereas Ayres would have likely explained the activity of NGOs in terms of institutional resistance, Tool would have favorably commented on their democratic significance, while remaining sensitive to the possibility of ideologically-biased advocacy campaigns. In sum, the crucial complexity distinction refers to private versus public goods. The potential for manipulation—and hence for discourse failure—is much higher when NGOs use political communication strategies to promote public goods than in the case of corporations using marketing strategies to promote private goods. In the latter case, citizens find it much easier to develop a rational perspective based on personal experience because direct feedback mechanisms tend to support learning loops.

In conclusion, the case of the anti-GMO advocacy calls for a new conceptualization of how democracy, science, and technology fit together in an instrumental way, and this is where Luhmann's idea of complexity reduction provides a valuable starting point for future debates in institutional economics. A Luhmannian reading of Tool's limiting conditions of institutional adjustment suggests that complexity reduction potentially qualifies as an

instrumental principle for the alignment between technology and institutions, for the complexity of the warrantable knowledge may obstruct both its understanding and its acceptance by affected stakeholders. Far from being automatic, the understanding and acceptance of institutional adjustment call for, and underscore the importance of, the engagement of NGOs in democratic discourses. But if this engagement is steered by incentives to promote discourse failures, it will be difficult to align technology and institutions in an instrumental way, falling instead back to the win-lose mode of moralistic reasoning. However, if this alignment is indeed instrumental, it will create win-win potentials for all concerned stakeholders, and society as a whole. Therefore, NGOs need an enabling environment—a functional governance structure with appropriate incentives—to better fulfill their societal role.

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## References

- Académie des Sciences (2014), *Directorate-General for Research and Innovation Biotechnologies*, Agriculture, Food. Press Release, Paris.
- Ayres, C.E. (1961), *Toward a reasonable society: The values of industrial civilization*, Austin: University of Texas Press.
- Ayres, C.E. (1978), *The theory of economic progress: A study of the fundamentals of economic development and cultural change*, Kalamazoo, MI: New Issues Press.
- Bernauer, T. & Meins, E. (2003), “Technological revolution meets policy and the market: Explaining cross-national differences in agricultural biotechnology regulation,” *European Journal of Political Research*, Vol. 42, pp. 643-683.
- Blancke, S., Breusegem, F.V., Jaeger, G.D., Braeckman, J., & Montagu, M.V. (2015), “Fatal Attraction: The Intuitive Appeal of GMO Opposition,” *Trends in Plant Science*, Vol. 20, pp. 414-418
- Bush, P. D. (1987), “The theory of institutional change”, *Journal of Economic issues*, Vol. XXI No. 3, pp. 1075-1116.
- Caplan, B. (2007), *The Myth of the Rational Voter*, Princeton University Press: Princeton, NJ, USA; Oxford, UK.
- Clark, D.P. (2010), *Germs, genes, & civilization: How epidemics shaped who we are today*. Upper Saddle River, NJ: FT Press.
- Coghlan, A. (2015), “More than half of EU officially bans genetically modified crops”, *Daily News*, accessed at <https://www.newscientist.com/article/dn28283-more-than-half-of-european-union-votes-to-ban-growing-gm-crops/> on November 25<sup>th</sup> 2017.
- Connor, M., & Siegrist, M. (2010), “Factors influencing people's acceptance of gene technology: the role of knowledge, health expectations, naturalness, and social trust”, *Science Communication*, Vol. 32 No. 4, pp. 514-538.



- Davison, J. (2010), "GM plants: Science, politics and EC regulations", *Plant Science*, Vol. 178 No. 2, pp. 94-98.
- Dewey, J. (1922), *Human Nature and Conduct: An Introduction to Social Psychology*. Henry Holt and Co. New York.
- Dewey, J. (1929), *The Quest for Certainty: A Study of the Relation of Knowledge and Action*. George Allen & Unwin, London.
- Doh, J. P. & Guay, T. R. (2006), "Corporate Social Responsibility, Public Policy, and NGO Activism in Europe and the United States: An Institutional-Stakeholder Perspective," *Journal of Management Studies*, Vol. 43 No. 1, pp. 47-73.
- Dugger, W.M. (1995), "Beyond technology to democracy: The Tool legacy in instrumentalism", in: C.M.A. Clark (Ed.), *Institutional economics and the theory of social value: Essays in Honor of Marc R. Tool*. New York: Springer, 195-207.
- Elsner, W. (2012), "The theory of institutional change revisited: The institutional dichotomy, its dynamic, and its policy implications in a more formal analysis", *Journal of Economic Issues*, Vol. 46 No. 1, pp. 1-44.
- Eur-lex (2001), *Directive 2001/18/EC of the European Parliament and of the Council of 12 March 2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC – Commission Declaration*. Accessed at <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0018> on November 25<sup>th</sup> 2017.
- European Academies Science Advisory Council (2013), *Planting the future*. Accessed at [http://www.easac.eu/fileadmin/Reports/Planting\\_the\\_Future/EASAC\\_Planting\\_the\\_Future\\_LAY\\_SUMMARY.pdf](http://www.easac.eu/fileadmin/Reports/Planting_the_Future/EASAC_Planting_the_Future_LAY_SUMMARY.pdf) on November 25<sup>th</sup> 2017.
- European Commission (2010), "A decade of EU-funded GMO research (2001-2010)", *Directorate-General for Research and Innovation Biotechnologies, Agriculture, Food*, Luxembourg.
- European Commission (2016), *GMO legislation*. Accessed at [http://ec.europa.eu/food/plant/gmo/legislation\\_en](http://ec.europa.eu/food/plant/gmo/legislation_en) on November 25<sup>th</sup> 2017.
- Fink, G., & Yolles, M. (2018), "Affect and cognition, part 1: "cross-fire" interaction model", *Kybernetes*, Vol. 47 No. 1, pp. 80-98.
- Foster, J. F. (1981), "The theory of institutional adjustment", *Journal of Economic Issues*, Vol. XV No. 4, pp. 923-928.
- Friends of the Earth (2016), *Genetic engineering*. Accessed at <http://www.foe.org/projects/food-and-technology/genetic-engineering> on November 25<sup>th</sup> 2017.
- Friends of the Earth (2016), *Genetic engineering*. Accessed at <http://www.foe.org/projects/food-and-technology/genetic-engineering> on November 25<sup>th</sup> 2017.
- Galbraith, J.K. 1967, *The New Industrial State*. Princeton: Princeton University Press.
- German National Academy of Sciences Leopoldina, acatech – the National Academy of Science and Engineering, and the Union of the German Academies of Sciences and Humanities (2015), *Academies issue statement on progress in molecular breeding and on the possible national ban on cultivation of genetically modified plants*. Accessed at [https://www.leopoldina.org/uploads/tx\\_leopublication/2015\\_03\\_26\\_Statement](https://www.leopoldina.org/uploads/tx_leopublication/2015_03_26_Statement)

- \_on\_Molecular\_Breeding\_final.pdf on November 25<sup>th</sup> 2017].
- Greenpeace (2016a), *What's wrong with genetic engineering (GE)?* Accessed at <http://www.greenpeace.org/international/en/campaigns/agriculture/problem/genetic-engineering/> on November 25<sup>th</sup> 2017.
- Greenpeace (2016b), *EU bows to US pressure to open door to new GMOs*. Accessed at <http://www.greenpeace.org/international/en/news/Blogs/makingwaves/eu-us-pressure-new-gmo/blog/56256/> on November 25<sup>th</sup> 2017.
- Haidt, J. & Graham, J. (2007), "When morality opposes justice: Conservatives have moral intuitions that liberals may not recognize", *Social Justice Research*, Vol. 20, pp. 98-116.
- Haidt, J. (2012), *The righteous mind: why good people are divided by politics and religion*. London: Penguin Press.
- Hansen, M. (2014), *Written testimony on SB 778, a Bill to Require Labeling of Genetically Engineered Food before the Maryland Senate Health Committee Annapolis*. Accessed at <http://consumersunion.org/wp-content/uploads/2014/04/GE-Labeling-SB778-3-11-14.pdf> on November 25<sup>th</sup> 2017.
- Hayden, F. G. (2017), "Complex Systems Characteristics and Theoretical Development for Analysis Inside Institutions," *Journal of Economic Issues*, Vol. 50 No. 2, pp. 398-405.
- Hazlett, T. W. (2017), *The political spectrum: The tumultuous liberation of wireless technology, from herbert hoover to the smart phone*. New Haven & London: Yale University Press.
- Hielscher, S., Beckmann, M. & Pies, I. (2014), "Participation versus Consent: Should Corporations Be Run according to Democratic Principles?", *Business Ethics Quarterly*, Vol. 24 No. 4, pp. 533-563.
- Hielscher, S., Pies, I., & Valentinov, V., Chatalova, L. (2016), "Rationalizing the GMO Debate: The Ordonomic Approach to Addressing Agricultural Myths", *International Journal of Environmental Research and Public Health*, Vol. 13 No. 476.
- Hielscher, S., Winkin, J., Crack, A. & Pies, I. (2017), "Saving the Moral Capital of NGOs: Identifying One-Sided and Many-Sided Social Dilemmas in NGO Accountability", *Voluntas: International Journal of Voluntary and Nonprofit Organizations*, Vol. 28 No. 4, pp. 1562-1594. doi:10.1007/s11266-016-9807-z.
- Hilbeck, A., Binimelis, R., Defarge, N., Steinbrecher, R., Székács, A., Wickson, F., Antoniou, M., Bereano, P.L., Clark, E. A., Hansen, M., Novotny, E., Heinemann, J., Meyer, H., Shiva, V. & Wynne B. (2015), "No scientific consensus on GMO safety", *Environmental Sciences Europe*, Vol. 27 No. 4.
- Hill, L.E., & Troub, R.M. (1995), "Pragmatism as a normative theory of social value and economic ethics", in: C.M.A. Clark (Ed.), *Institutional economics and the theory of social value: Essays in Honor of Marc R. Tool*, New York: Springer, pp. 75-84.
- Hodgson, G.M. (2004), *The evolution of institutional economics: Agency, structure and Darwinism in American institutionalism*. London et al.: Routledge.
- Horster, D. (2012), „Ethik“, in O. Jahraus, A. Nassehi, M. Grizelj, I. Saake, C. Kirchmeier & J. Müller (Ed.), *Luhmann Handbuch: Leben – Werk – Wirkung*. Stuttgart et al.: J.B.Metzler, pp. 336-340.

- Iliopoulos, C. (2013), "Public policy support for agricultural cooperatives: An organizational economics approach", *Annals of Public and Cooperative Economics*, Vol. 84 No. 3, pp. 241–252.
- Klein, P. A. (1995), "Instrumental valuation in a democratic society", in: C.M.A. Clark (Ed.), *Institutional economics and the theory of social value: Essays in Honor of Marc R. Tool*. New York: Springer, pp. 129-151.
- Lah, M., Sušjan, A., & Redek, T. (2016), "Corporate Communication and Economic Theory: An Institutional Perspective", *Journal of Economic Issues*, Vol. 50 No. 1, pp. 121-144.
- Laureates Letter Supporting Precision Agriculture (2016), *To the Leaders of Greenpeace, the United Nations and Governments around the world*. Accessed at [http://supportprecisionagriculture.org/nobel-laureate-gmo-letter\\_rjr.html](http://supportprecisionagriculture.org/nobel-laureate-gmo-letter_rjr.html) on November 25<sup>th</sup> 2017.
- Lindebaum, D., Geddes, D., & Gabrie, Y. (2016), "Moral Emotions and Ethics in Organisations: Introduction to the Special Issue", *Journal of Business Ethics*, Vol. 141 No. 4, pp. 645-656.
- Loasby, B. J. (1999), *Knowledge, Institutions and Evolution in Economics*. London et al: Routledge.
- Luhmann, N. (1991), "Paradigm Lost: On the ethical reflection of morality," *Thesis Eleven*, Vol. 29, pp. 82-94.
- Luhmann, N. (1993), "The code of the moral", *Cardozo Law Review*, Vol. 14, pp. 995-1009.
- Luhmann, N. (1995), *Social Systems*. Stanford, CA: Stanford University Press.
- Lynas, M. (2015), With G.M.O. policies, Europe turns against science. *New York Times*, accessed at [http://www.nytimes.com/2015/10/25/opinion/sunday/with-gmo-policies-europe-turns-against-science.html?ref=opinion&\\_r=5](http://www.nytimes.com/2015/10/25/opinion/sunday/with-gmo-policies-europe-turns-against-science.html?ref=opinion&_r=5) on November 25<sup>th</sup> 2017.
- Lynas, M. (2015), With G.M.O. policies, Europe turns against science. *New York Times*, accessed at [http://www.nytimes.com/2015/10/25/opinion/sunday/with-gmo-policies-europe-turns-against-science.html?ref=opinion&\\_r=5](http://www.nytimes.com/2015/10/25/opinion/sunday/with-gmo-policies-europe-turns-against-science.html?ref=opinion&_r=5) on November 25<sup>th</sup> 2017.
- MacDonald, C. & Whellams, M. (2007), "Corporate Decisions about Labelling Genetically Modified Foods", *Journal of Business Ethics*, Vol. 75 No. 2, pp. 181-189.
- Mansbridge, J., Bohman, J., Chambers, S., Christiano, T., Fung, A., Parkinson, J., Thompson, D. F., & Warren, M. E. (2012), A systemic approach to deliberative democracy, in: Parkinson, J. (Ed.): *Deliberative systems: Deliberative democracy at the large scale*, Cambridge and New York: Cambridge University Press, pp. 1-26.
- McCormick, K. (2006), *Veblen in plain English*. Youngstown, NY: Cambria Press.
- Ming, J., Li Tong, P. V., Viswanath, Z. Z. (2015), "Word Power: The Impact of Negative Media Coverage on Disciplining Corporate Pollution", *Journal of Business Ethics*, Vol. 138 No. 3, pp. 437-458.
- Murdock, G.P. (1980). *Theories of illness: A world survey*. Pittsburgh, PA: University of Pittsburgh Press.
- National Academies of Sciences, Engineering, and Medicine (2016), *Genetically Engineered Crops: Experiences and Prospects*, Washington DC: The National Academies Press.
- Neckel, S., & Wolf, J. (1994), "The fascination of amorality: Luhmann's theory of morality

- and its resonances among German intellectuals”, *Theory, Culture & Society*, Vol. 11 No. 2, pp. 69-99.
- North, D. C. (1990), *Institutions, Institutional change, and Economic performance*. New York: Cambridge University Press.
- Paarlberg, R. (2014), “A dubious success: The NGO campaign against GMOs”, *GM Crops & Food*, Vol. 5 No. 3, pp. 223-228.
- Piderit, S.K. (2000), “Rethinking resistance and recognizing ambivalence: A multidimensional view of attitudes toward an organizational change”, *Academy of Management Review*, Vol. 25 No. 4, pp. 783-794.
- Popper, K. R. (1945, 2002), *The Open Society and its Enemies, Vol. 2: The High Tide of Prophecy: Hegel, Marx, and the Aftermath*. London and New York.
- Reese-Schäfer, W. (1999), *Niklas Luhmann zur Einführung*. Hamburg: Junius.
- Roth, S. (2017), “Parsons, Luhmann, Spencer Brown. NOR design for double contingency tables”, *Kybernetes*, Vol. 46 No. 8, pp. 1469-1482.
- Roth, S., Sales, A., & Kaivo-oja, J. (2017), “Multiplying the Division of Labour: Functional Differentiation of the Next Key Variables in Management Research”, *Systems Research and Behavioral Science*, Vol. 34 No. 2, pp. 195-207.
- Rutherford, M. (2007), “American institutionalism and its British connections”, *The European Journal of the History of Economic Thought*, Vol. 14 No. 2, pp. 291-323.
- Schaik, C.v. (2016), *The good book of human nature: An evolutionary reading of the Bible*. New York: Basic Books.
- Séralini G.E., Clair E, Mesnage R, Gress S, Defarge N, Malatesta M, Hennequin, D., & de Vendômois, J. S. (2014), “Republished study: long-term toxicity of a Roundup herbicide and a Roundup-tolerant genetically modified maize,” *Environmental Sciences Europe*, Vol. 26 No. 1.
- Siegrist, M. (2000), “The influence of trust and perceptions of risks and benefits on the acceptance of gene technology”, *Risk Analysis*, Vol. 20, pp. 195-203.
- Smith, A. (1795, 1980), “The principles which lead and direct philosophical enquiries: illustrated by the history of astronomy”, in: Wightman, W. P. D. (Ed.), *Essays on Philosophical Subjects*, Oxford: Oxford University Press, pp. 33-105.
- Suedfeld, P., Tetlock, P. E., & Streufert, S. (1992). Conceptual/integrative complexity. In C. P. Smith (Ed.), *Handbook of Thematic Content Analysis* (pp. 393-400). New York: Cambridge University Press.
- Swinnen, J. (2011), “The right price of food”, *Development Policy Review*, Vol. 29 No. 6, pp. 667-688.
- Thierer, A. D. (2016), *Permissionless innovation: the continuing case for comprehensive technological freedom*. Arlington, Virginia: Mercatus Center George Mason University.
- Thompson, S. & Valentinov, V. (2017), “The neglect of society in the theory of the firm: A systems theory perspective”, *Cambridge Journal of Economics*, Vol. 41 No. 4, pp. 1061-1085.
- Tool, M. R. (1986), *Essays in Social Value Theory: A Neoinstitutionalist Contribution*. ME Sharpe.

- Tool, R. (2001), *The Discretionary Economy: A Normative Theory of Political Economy*. New Brunswick et al.: Transaction Publishers.
- Valentinov, V. (2011), “The meaning of nonprofit organization: insights from classical institutionalism”, *Journal of Economic Issues*, Vol. 45 No. 4, pp. 901-916.
- Valentinov, V. (2017), "Wiener and Luhmann on feedback: from complexity to sustainability", *Kybernetes*, Vol. 46 No. 3, pp. 386-399.
- Valentinov, V., Hielscher, S. & Pies, I. (2016), “Emergence: A Systems Theory’s Challenge to Ethics”, *Systems Practice and Action Research*, Vol. 29, pp. 597-610.
- Veblen, T. (1898), “Why is economics not an evolutionary science?”, *The Quarterly Journal of Economics*, Vol. 12 No. 4, pp. 373-397.
- Veblen, T. (1990), *The place of science in modern civilization*. New Brunswick, NJ: Transaction Publishers.
- Wallis, S. E. (2015). The science of conceptual systems: A progress report. *Foundations of Science*, Vol. 21 No. 4, pp. 579-602.
- Wallis, S.E. & Valentinov, V. (2016), “The imperviance of conceptual systems: cognitive and moral aspects”, *Kybernetes*, Vol. 45 No. 9, pp. 1437-1451.
- Will, M. G. & Pies, I. (2016), “Discourse Failures and the NGO Sector: How Campaigning Can Undermine Advocacy”, *Voluntas*, doi: 10.1007/s11266-016-9770-8.

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<sup>1</sup> NGOs often use a paper by Séralini et al. (2014) showing a higher death rate for rats fed with GM food. This is one of the only two studies showing such effects, and it is also a highly contested one. Following accusations of technical errors and misinterpretations, it had to be retracted from the journal where it had been published first. Later, it has been republished in an open access discussion-oriented journal (cf. Casassus 2014). Today, it owes much of its influence to the NGOs’ claim that the mainstream research is allegedly captured by industry interests. Unfortunately, this claim does not acknowledge the fact that the Séralini research group itself had been funded by Greenpeace.